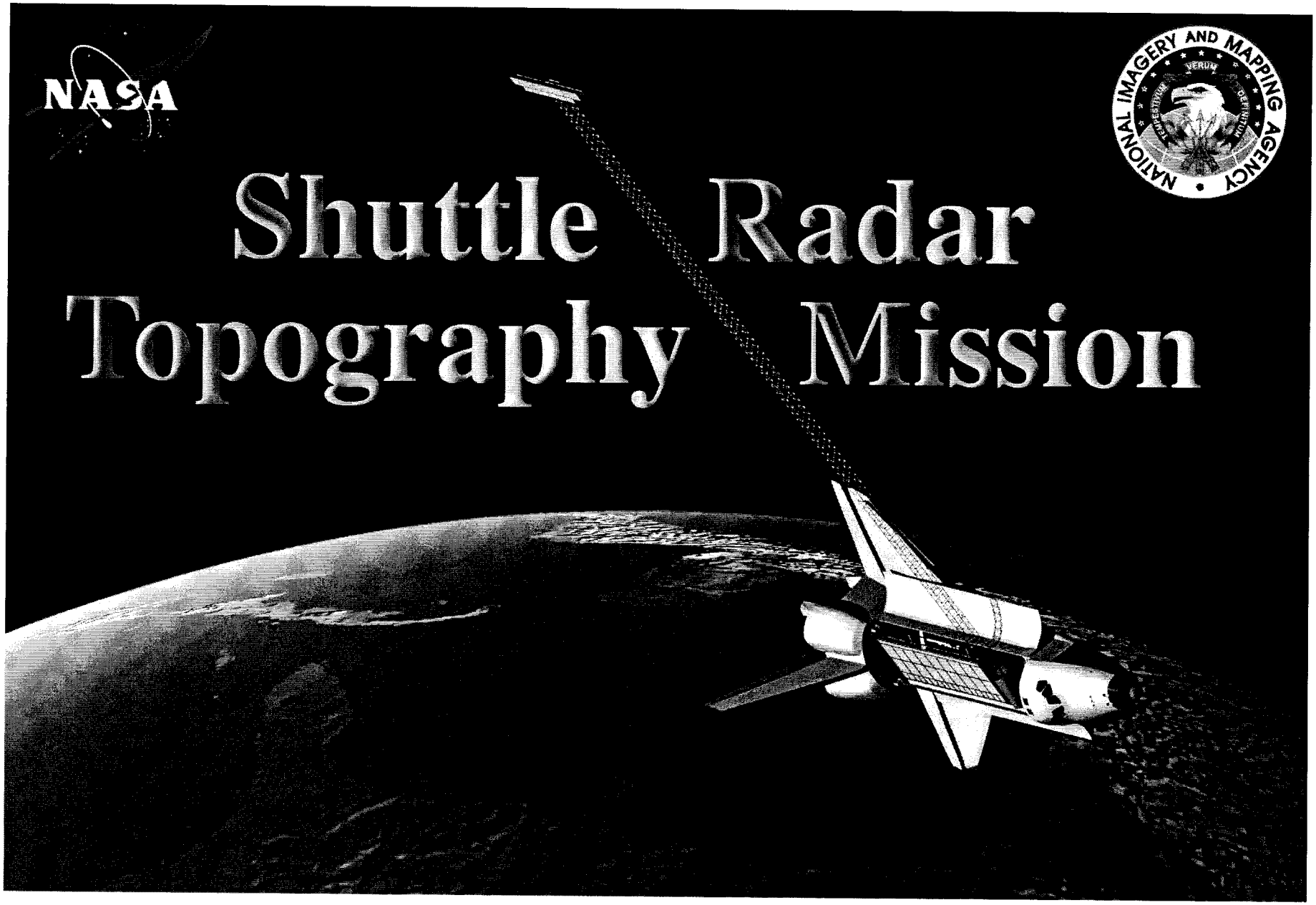
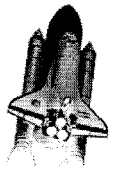

NASA
NATIONAL IMAGERY AND MAPPING AGENCY
Shuttle Radar Topography Mission

JPL

THE SHUTTLE RADAR TOPOGRAPHY MISSION

Launch
Endeavour (STS-99) launched February 11, 2000, on an 11-day flight



Reflown hardware : Primary antenna & support structure, RF electronics, command/telemetry system, power distribution system, digital data system, recorders, target tracker, attitude gyros

New hardware: Mast & canister, secondary antenna, star tracker, GPS

225 km interferometric swaths mapped all landmass between ± 60° latitude

Data recorded on-board
~ 8.6 TBytes C-band
~ 3.7 TBytes X-band

Data returned with Shuttle to Ground Data Processing Facility

Two years processing, verification, and validation

Digital elevation data and images Delivered in mosaicked blocks

US Geological Survey
EROS Data Center

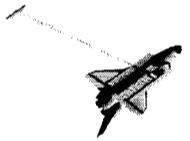
Civilian archive and distribution

NIMA product generation and distribution to Department of Defense users

JPL

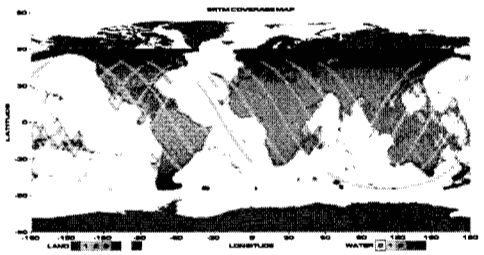
SHUTTLE RADAR TOPOGRAPHY MISSION

OBJECTIVES

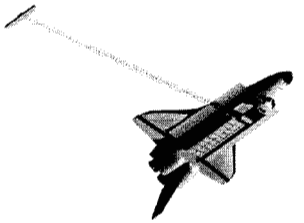


During a single 11-day Space Shuttle flight, SRTM collected data for:

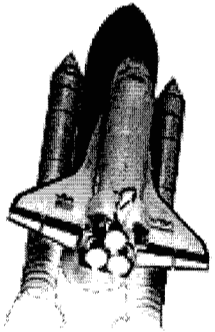
- **A digital topographic map of 80% of Earth's land surface with:**
  - **30 meter horizontal resolution**
  - **10 meter relative height error**
  - **Globally consistent characteristics and datum**
- **Rectified, terrain-corrected C-band radar image mosaic**



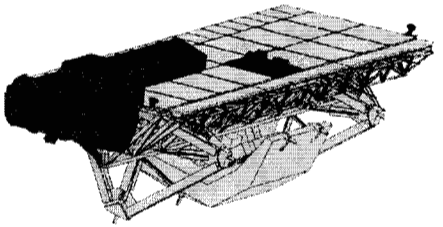
SRTM Mission Overview



Launch
Current manifest STS-101, 9/16/99
Could move to as early as 6/99
11-day flight

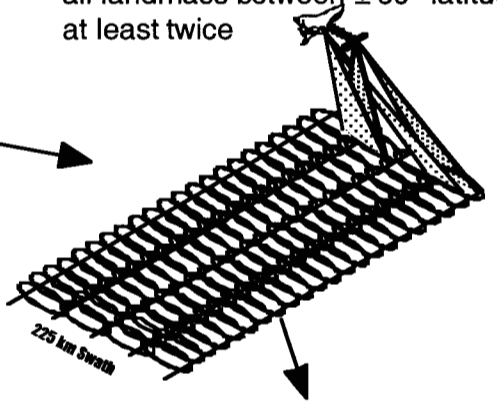


Reflown hardware : antenna & support structure, RF electronics, command/telemetry system, power distribution system, digital data system, recorders, target tracker, attitude gyros

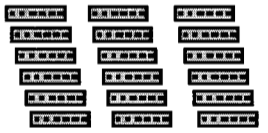


New hardware: Canister & mast, secondary antenna, star tracker, GPS

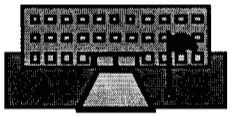
225 km interferometric swaths map all landmass between ± 60° latitude at least twice



Data recorded on-board
~ 6.5 TBytes C-band
~ 3.3 TBytes X-band



Data returned with Shuttle to Ground Data Processing Facility



One year processing

Digital elevation data delivered in 5°x5° mosaicked blocks
Images delivered as rectified, mosaickable strips

NIMA data validation, verification, product generation and distribution to users

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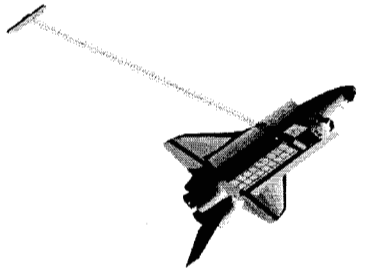
SHUTTLE RADAR TOPOGRAPHY MISSION

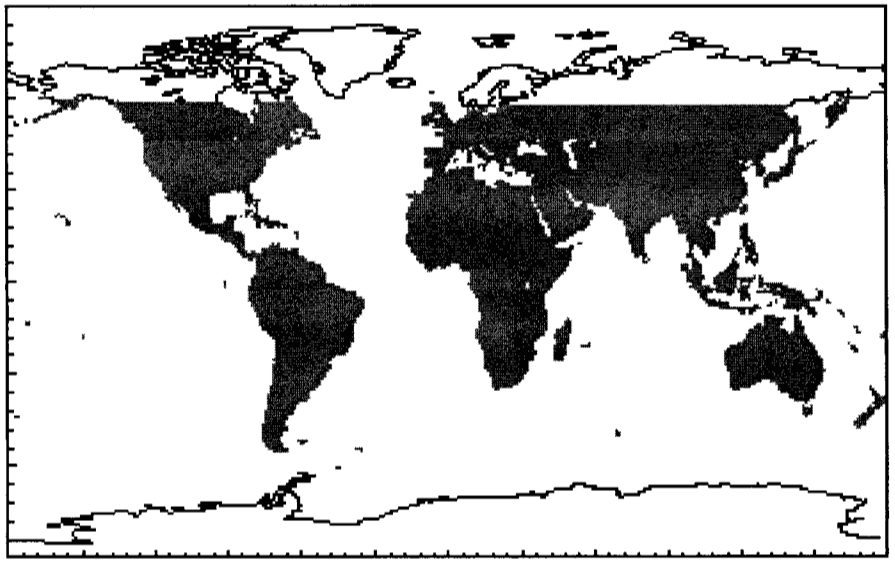


OBJECTIVES

During a single 11-day Space Shuttle flight, SRTM will produce:

- **A digital topographic map of 80% of Earth's land surface with:**
  - **•30 meter horizontal resolution**
  - **•10 meter relative height error**
  - **•Globally consistent characteristics and datum**

•Rectified, terrain-corrected, C-band radar image mosaic



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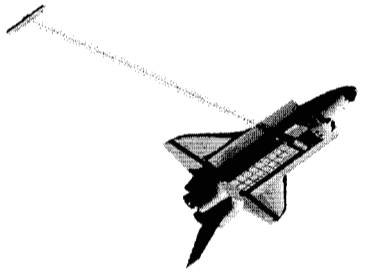
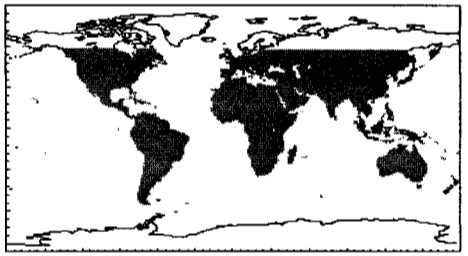
SHUTTLE RADAR TOPOGRAPHY MISSION



MISSION OVERVIEW



- Objective: Acquire ITED2-level data for 80% of Earth landmass.
  - •10 meter relative height resolution @ 90% level
  - •16 meter absolute height resolution @ 90% level
  - •One arc-sec (30 meter) posting
  - • Mosaickable terrain-corrected geocoded images
- SIR-C and X-SAR modified as fixed-baseline single-pass interferometric SARS
  - •~80% of payload is previously flown hardware
  - •Additional hardware uses designs derived from highly successful programs provided by same vendors
  - •Fixed baseline provides uniform data set with globally consistent characteristics and datum
  - •Single-pass IFSAR eliminates errors due to temporal decorrelation and propagation delay variations
- All data collected during 11-day Shuttle flight
  - •Launch manifested for September 1999
  - •Mission profile very similar to two previous SIR-C/X-SAR missions
  - •Data volume, duty cycle, operational requirements same as or less than those of previous flights
  - •Land mass will be mapped at least twice with crossing illumination.
- All data products completed within one year of launch

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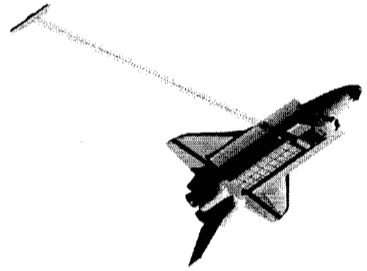
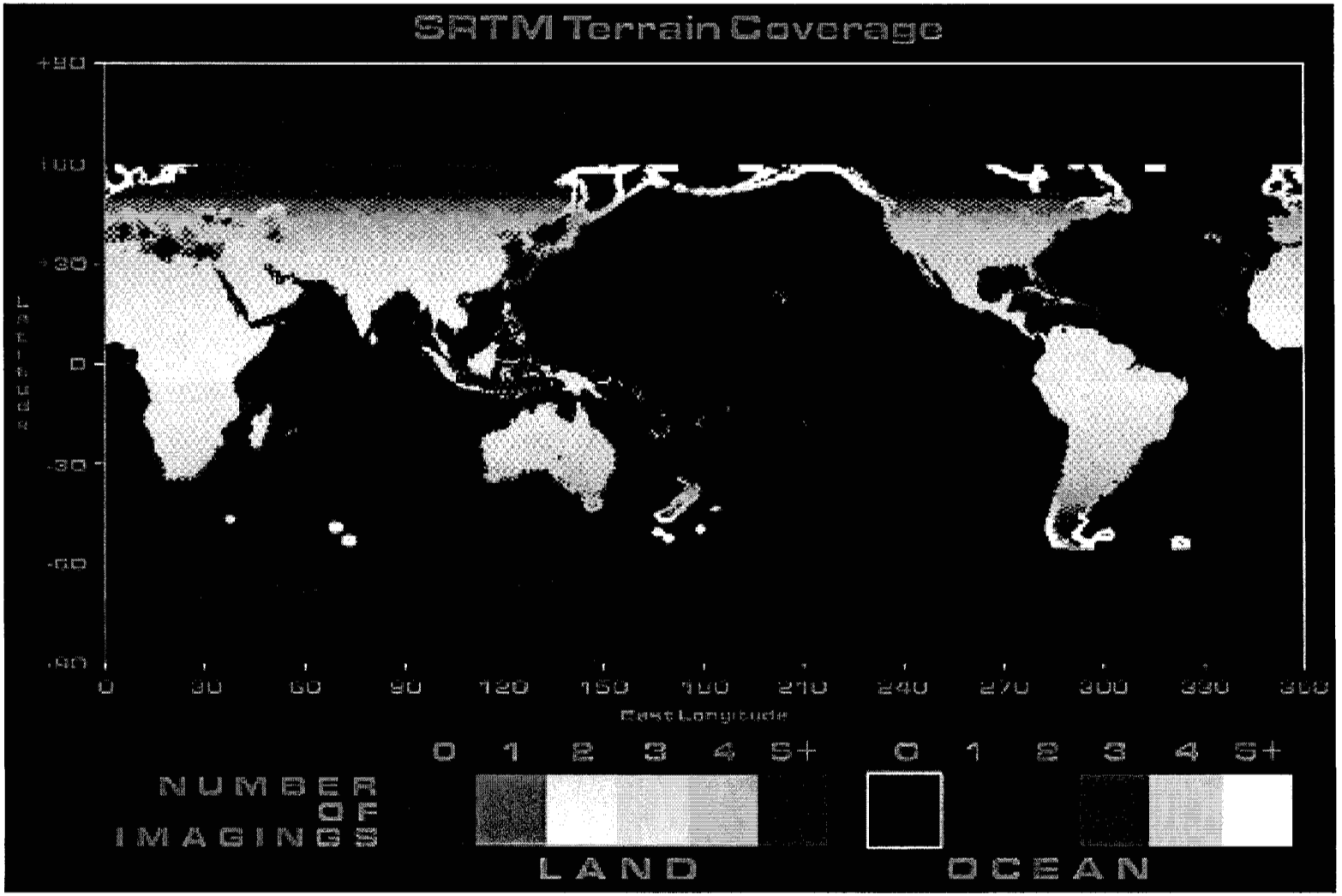
SHUTTLE RADAR TOPOGRAPHY MISSION



SRTM Ground Coverage

10-DAY MISSION; 159 ORBITS
(NOT INCLUDING CALIBRATION OCEAN DATATAKES)



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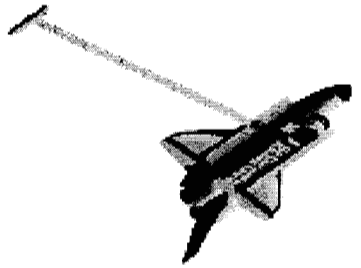
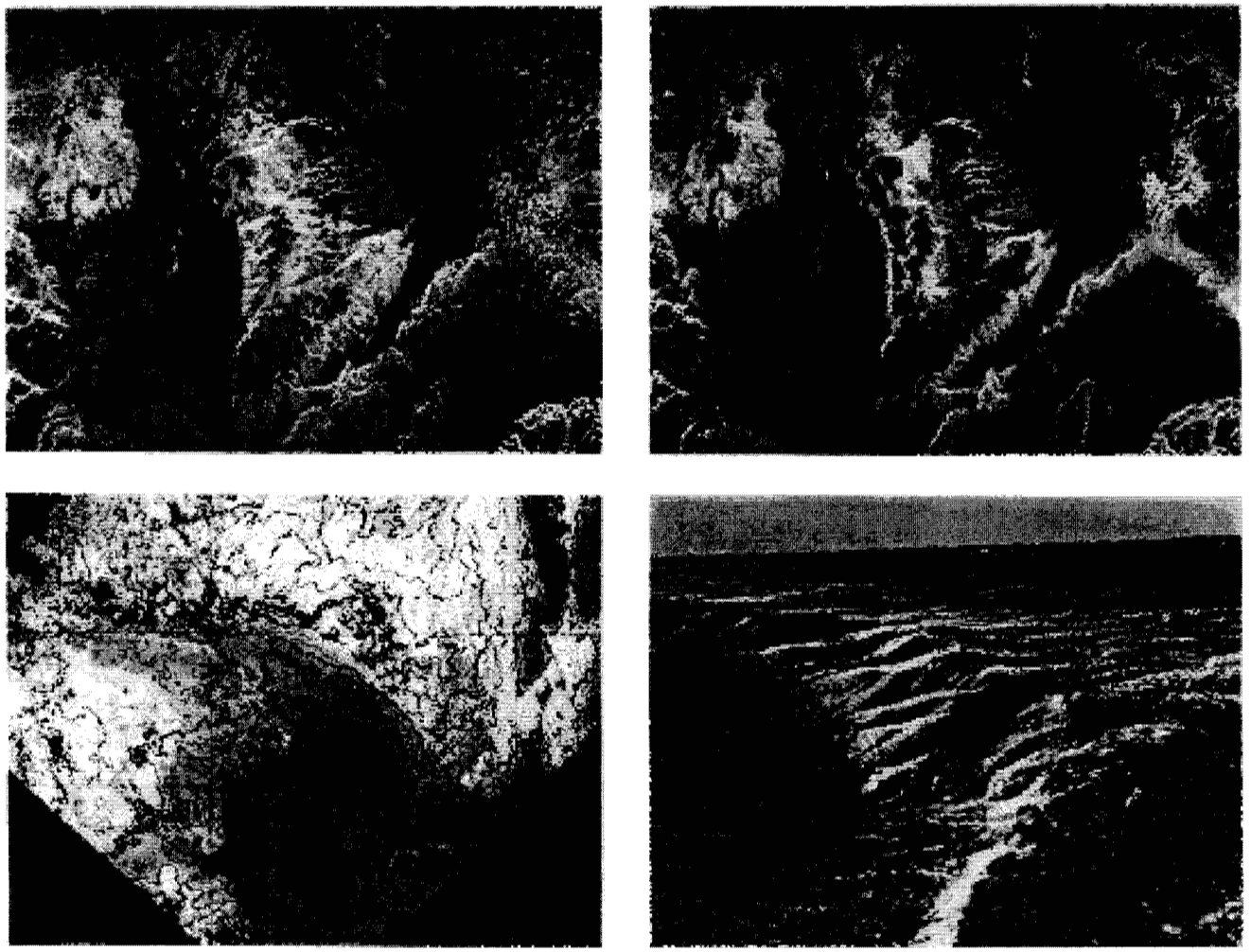
SHUTTLE RADAR TOPOGRAPHY MISSION
Interferometric SAR Topo Map



TOPOGRAPHIC SAR IMAGE
SIR-C / LONG VALLEY, CALIFORNIA



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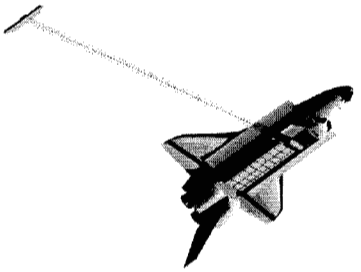
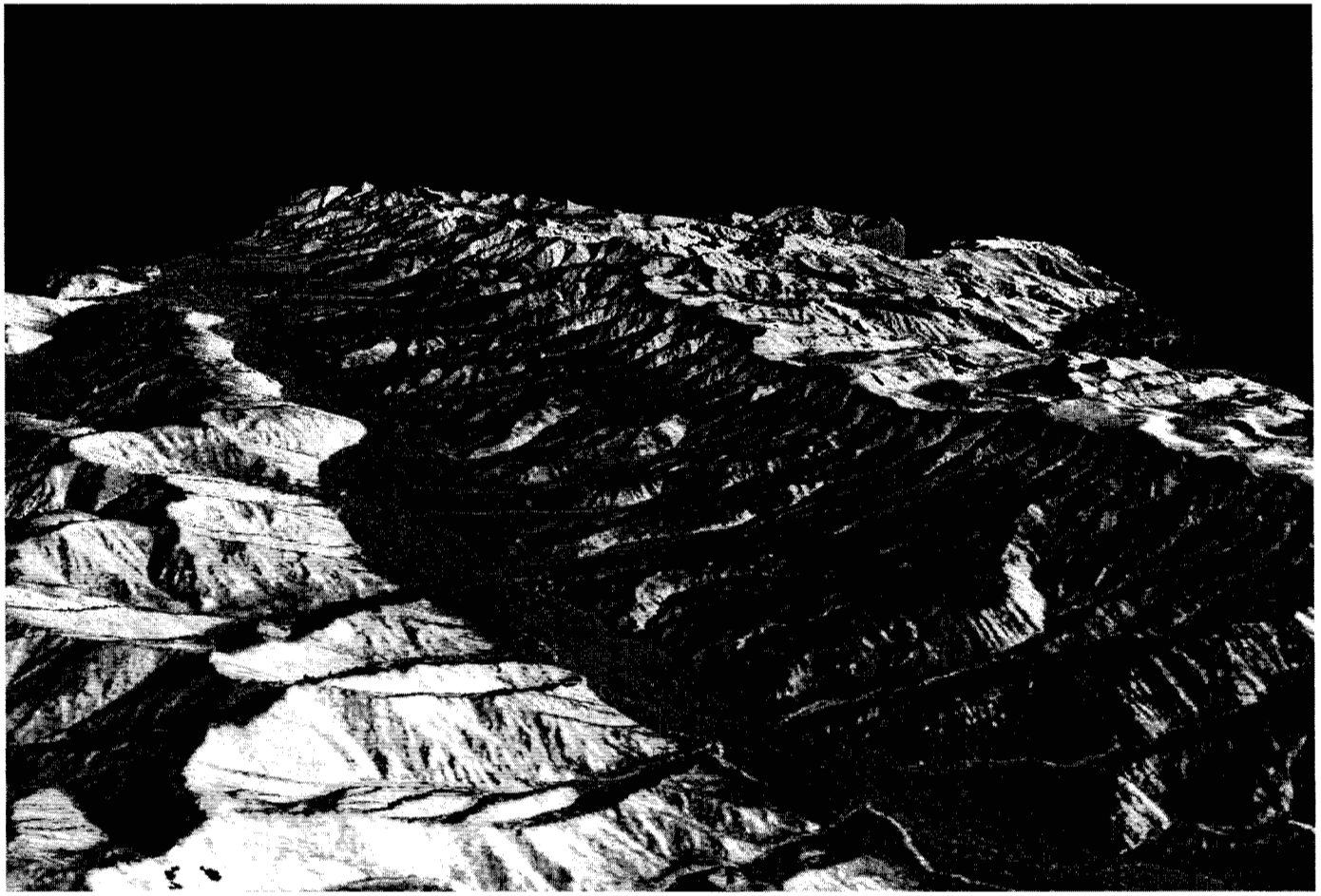
SHUTTLE RADAR TOPOGRAPHY MISSION



Karakax Valley, Western China

Radar Interferometry

Scientists use visualizations like this for mapping common landforms in desert regions to learn more about Earth's past climate changes. This image is representative of products which will be created from data obtained by the Shuttle Radar Topography Mission scheduled for launch in 1999.



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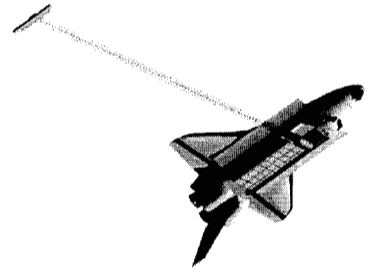
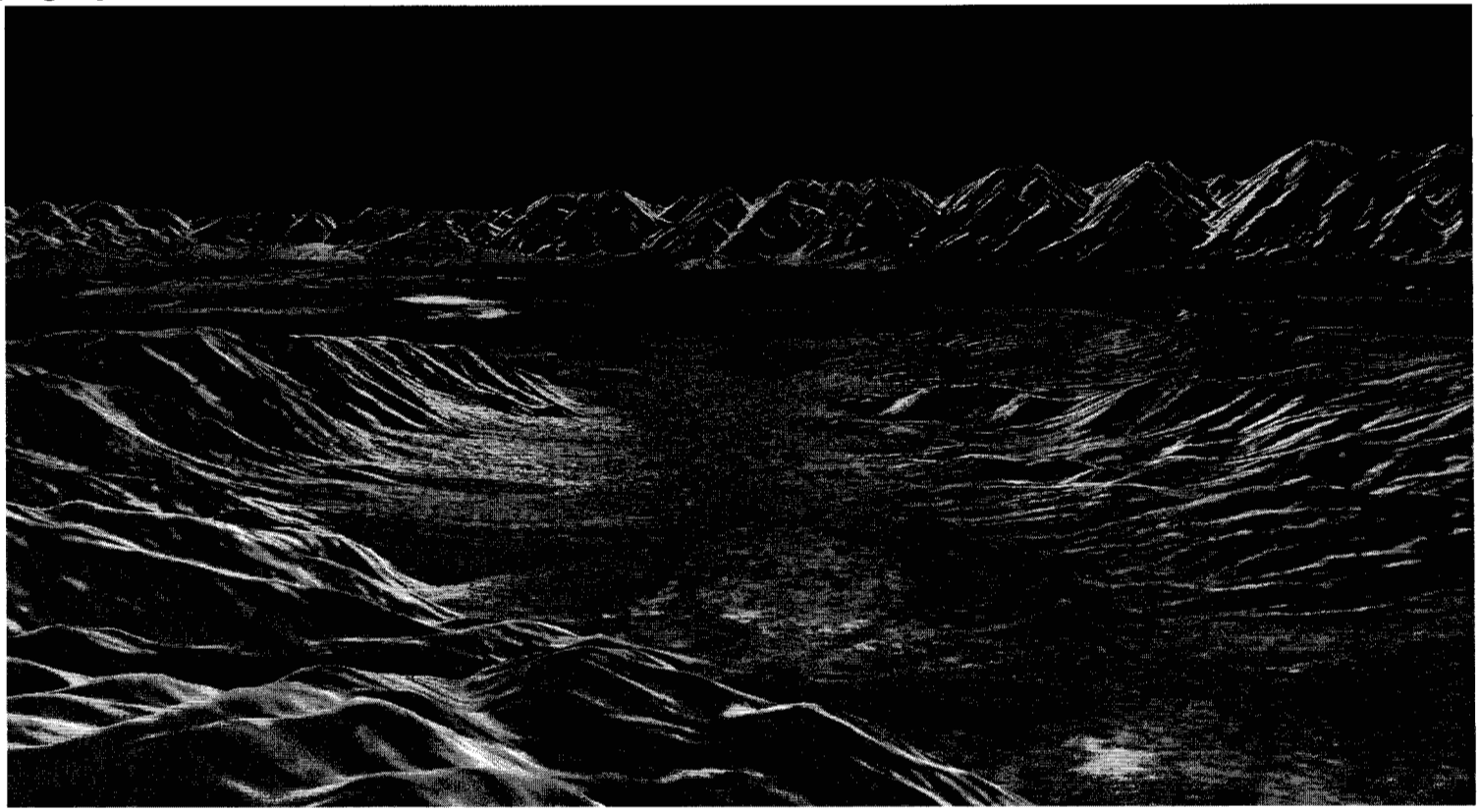
SHUTTLE RADAR TOPOGRAPHY MISSION

Saline Valley, California

Radar Interferometry



This image was created by overlaying radar image data onto a digital elevation model that was generated from two radar data sets. Through the technique of interferometry, the data sets are compared to obtain elevation information. Visualizations like this are helpful to scientists because they illustrate the relationships of different surface types, and show topographic features such as mountains and valleys.



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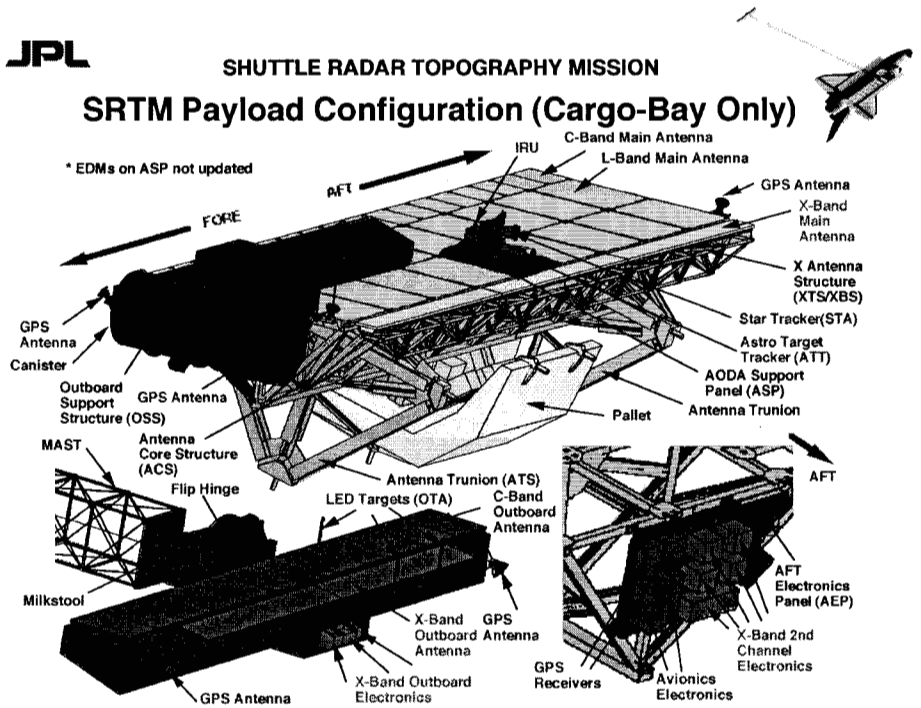
SHUTTLE RADAR TOPOGRAPHY MISSION

SRTM Payload Configuration (Cargo-Bay Only)



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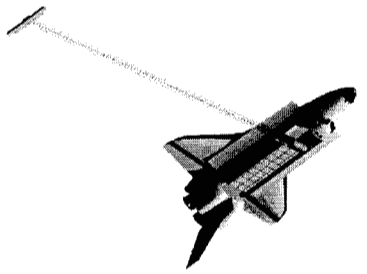
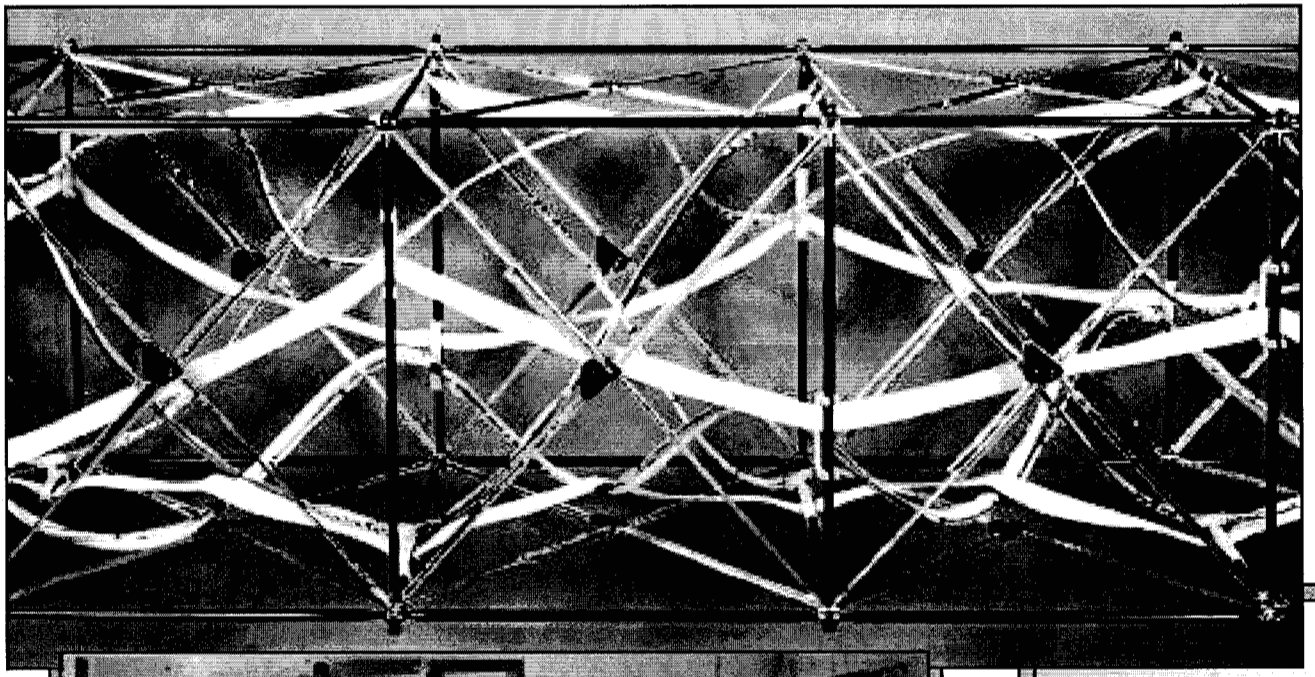
SHUTTLE RADAR TOPOGRAPHY MISSION

SRTM Summary

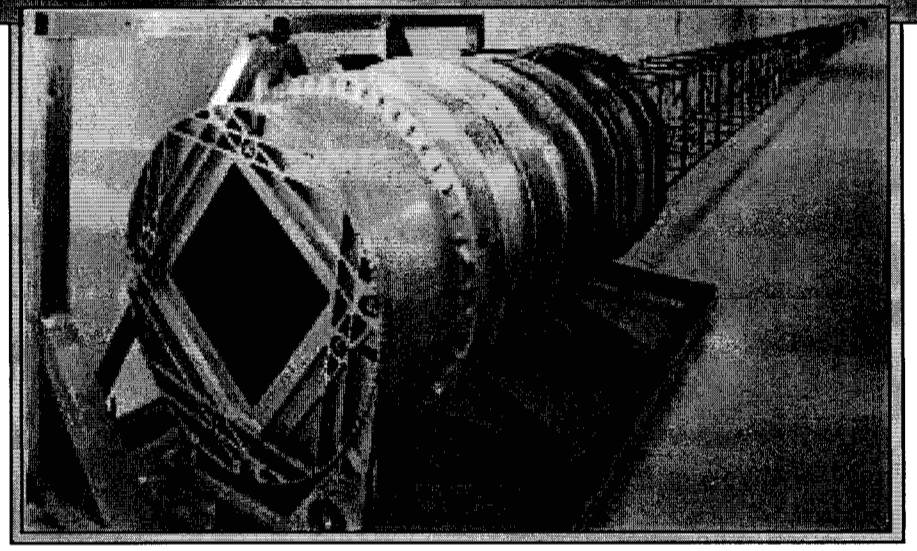


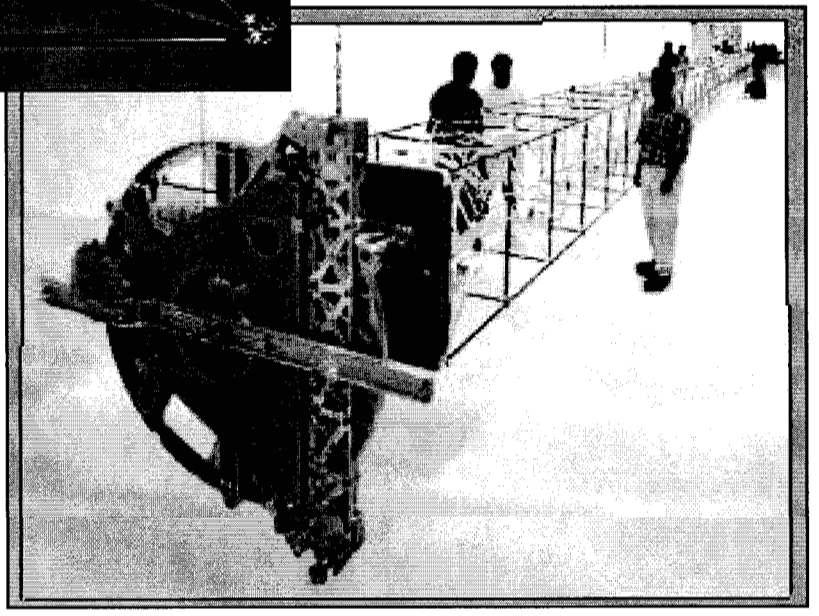
- SRTM will produce a uniform global (80%) topography data set twice as accurate as existing data set
  - Significant impacts in many applications, including national security and scientific applications
- SRTM will provide global (80%) C-band and partial X-band scattering maps which can be used for large scale classification
- SRTM will be the first spaceborne fixed baseline interferometric SAR
  - Pushing state-of-the-art technologies which will lead to better design and implementation for future interferometric SAR missions
  - Advantages over repeat pass interferometry, immune to temporal decorrelation and other time dependent disturbances
- SRTM utilizes flown hardware which enables quick pace development at substantial reduction in cost
  - Present the best value to the customers with the quickest data product delivery, unattainable with other technologies

Shuttle Radar Topography Mission (SRTM) Hardware



The mast supports a 360 kg passive antenna at its tip and carries 200 kg of stranded copper, coaxial, fiber optic and cold gas thruster lines along its length.





The 60 m SRTM Mast will be the longest structure ever to fly in space.